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FUNCTIONAL OUTCOME OF ORIF OF DISTAL FEMUR FRACTURE WITH INTRA-ARTICULAR EXTENSION

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ABSTRACT: BACKGROUND: Distal femur fractures with intra-articular extension are complex injuries which have been treated by different methods. The authors studied the functional outcome of management of distal femur fractures with the published literature. **MATERIALS AND METHODS:** Distal femur fractures with intra-articular extension treated with open reduction and internal fixation during the period Jan 2011-dec 2012 at Govt. Medical College, Surat formed the study population. They were evaluated to assess their clinical and functional results using Neer's Scoring system and compared with the available literature. The results were analyzed using different parameters; male vs. female, age distribution, functional outcomes and complications etc. **RESULTS:** The results were excellent in 56%, good in 24%, fair in 12% and poor in 08%. Results were assessed and found to be excellent in majority of cases with mean knee flexion being 94.1 degrees, mean fracture union time of 16.7 weeks, with mean full weight bearing duration of 13.92 weeks complications being knee stiffness (5), delayed union (6), infection (7), shortening (5) knee pain (15) **CONCLUSION:** Surgery in the form of ORIF is recommended for distal femur fractures with intra articular extension for good outcome and early mobilization with minimum preventable complications.

KEYWORDS: Distal femur fractures with intra-articular extension, ORIF (Open reduction and internal fixation), Neers scoring system.

INTRODUCTION: "Few injuries present more difficult problems than those associated with supracondylar and intercondylar fractures of femur"- Sir Reginald Watson Jones.⁽¹⁾ The above statement by one of the great orthopaedician aptly describes the complexity in treating these fractures. Severe soft tissue damage, comminution, intraarticular extension, injury to the Quadriceps and extra articular adhesions are some of the challenges faced by the surgeon.

In the early part of 20th century closed reduction as described by Watson Jones and John Charnley led to stiffness, angular deformities or shortening and needed prolonged confinement to the bed. This prompted the present generation of Orthopaedicians to indulge in a more aggressive treatment i.e. open reduction and internal fixation which led to complications like infection, non-union and inadequate fixation by an inexperienced surgeon.

AIMS AND OBJECTIVES: The aim of the study was to evaluate the functional outcomes of distal femur fractures with intra-articular extension in Government Medical College, Surat from Jan 2011-Dec 2012.

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MATERIALS AND METHODS: The present study was conducted to study the outcomes of management of distal femur fracture with inter-articular extension in department of orthopaedics, Government Medical College, Surat on patients operated during the period of two year from January 2011 to December 2012.

Study Design: Retrospective study.

Source of Data: Patients operated for distal femur fractures with intra-articular extension in the Department of Orthopaedics, New civil hospital Surat during the period of two year from January 2011 to December 2012.

Sample Size: All patients with for distal femur fractures with intra-articular extension who underwent operative procedure from January 2011 to December 2012 were selected for the study.

Selection Criteria:

Inclusion Criteria:

- All patients with age above 18 years having supracondylar and intercondylar fractures of femur with an indication for surgical management.

Exclusion Criteria:

- Pathological fractures.
- Polytrauma patients.
- Patients treated conservatively.
- Patients who were bed ridden or non-ambulatory.
- Patients with severe life threatening medical problems.

PROCEDURE: The study was approved by Ethical and Research committee of Government medical college, Surat. After finding suitability of inclusion and exclusion criteria patients were selected for study and briefed about the nature of the study, the interventions used and written informed consent was obtained.

The consented patients were enrolled into present study. Further descriptive data of the participant's like name, age, sex, detailed history were obtained by interviewing the participants and clinical examination and necessary investigations were recorded.

Upon arrival of the patient, primary emergency management was carried out. A thorough examination was done to rule out life threatening injuries.

Once the patient was hemodynamically stable the fractured extremity was immobilized in a Thomas's Splint and later in the emergency operation theatre upper tibial traction was applied and traction was given over a Bohler's frame in the ward.

In the present series there were 13 open fractures. All were treated by parenteral Cephalosporins from day one to a week thereafter or till the sutures was removed. Gentamycin was given for 5 days.

All procedures were done under spinal anesthesia. Implants used were Dynamic Condylar Screw (DCS), Locking Compression Plate (LCP) or Condylar Buttress Plate (CBP).

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Gentamycin was injected into the surgical site after fixation. Post-operative assessment of knee joint stability was done. Sutures were removed after 10-12 days.

Physiotherapy was started immediately and all patients were personally followed up.

The functional and radiographic results were recorded according to Neer's Criteria and Knee Society Score.

OBSERVATION AND RESULTS: Out of 50 patients, 39 (78%) were males and 11 (22%) were females.

Age: The youngest patient was 18 years old and the oldest 75 years old. The average age was 38.9 years.

Mode of Injury: About 78% patients had sustained road traffic accidents, remaining 22% were due to fall from height or domestic falls. The delay in discharge was due to associated injuries or infection. The average duration for full weight bearing was 13.92 weeks. Average range of motion of knee was 94.10. The average time of union was 16.7 weeks.

Among 50 patients there were 28 (58%) excellent results, 12 had (24%) good results, 6 (12%) had fair results and 4 (8%) were classified as poor (Table 1).

COMPLICATIONS: The complications we encountered include anterior knee pain in 15 patients, shortening in 5 patients. There were 7 cases infection which subsided after debridement and antibiotics. There were 6 delayed unions. There were no cases of implant failures.

DISCUSSION: The prognostic factors for supracondylar fracture include age, intra articular involvement, method of treatment, timing of joint mobilization etc.

Comparison of studies is often difficult because of difference in the classification schemes and the use of different methods of treatment [Neer et al (1967),⁽²⁾ Stewart et al (1996), Shatzker & Lambert].⁽³⁾

Multiple articles have been published documenting super or functional results using internal fixation (Chiron et al 1974, Muller et al, 1974⁽⁴⁾; Shelbourne et al, 1982,⁽⁵⁾ Siliski et al, 1989.⁽⁶⁾

Rigid fixation has also enabled earlier knee motion and weight bearing, which help prevent some of the serious complication attributed to prolonged bed rest and traction (Mooney et al, 1970,⁽⁷⁾ Neer et al 1967,⁽²⁾ Stewart et al, 1966).

There were 6 (12%) fair and 4 (8%) poor results in this study which was higher when compared to the study by EJ Yeap⁽⁸⁾ and Siliski⁽⁶⁾ which had 20% poor results.

Major contributing factors were:

1. Improper fixation due to complexity of comminution or surgical technique.
2. Elderly age group constituted majority, who were less motivated than young people to initiate exercises. Their bones were osteoporotic with very low osteogenic potential.
3. Delay in surgery was a factor which resulted in bad results.

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Schatzker obtained 74% better results. In our study it was 78%.

Acceptable knee flexion following treatment ranges from 650 (Brown et al, 1971)⁽⁹⁾ to 1170 (Shelbourne et al, 1982).⁽⁵⁾ In our study it was 94.10, which compared favorably with the literature.

Hence our study matches with most studies.

A study by SILISKI⁽⁶⁾ had post op. infection rate of 6%, while our study it was 14%.

CONCLUSION:

- Results are better in young patients. With early fixation, results are good even in the elderly.
- Earlier the surgery, better the results. Comminution of the fracture adversely affects the results.
- Early ORIF can be done in open uncontaminated fractures. Earlier the mobilisation, earlier the restoration of movement and better the outcome.

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Age (years)	Total	
	No.	PERCENTAGE (%)
18-30	19	38
31-40	9	18
41-50	14	28
51-60	5	10
61-70	1	2
71-80	2	4
Total	50	100

TABLE 1: Age distribution

Sex	No of patients	Percentage
Male	39	78
Female	11	22

TABLE 2: SEX DISTRIBUTION

Mechanism of injury	No. of case	Percentage
Road traffic accident	39	78
Fall from height	11	22
Total	50	100

TABLE 3: MECHANISM OF INJURY

Sex	Vehicular accident		Fall	
	No.	Percent	No.	Percent
Male	33	66	6	12
Female	6	12	5	10
Total	39	78	11	22

TABLE 4: RELATIONSHIP BETWEEN SEX AND CAUSE OF FRACTURE

Type of fracture	No of fracture	Percentage
Open	13	26
Closed	37	74

TABLE 5: Type of fracture

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Union (weeks)	No. of cases	Percentage
<16	21	42
16-18	12	24
18-20	8	16
20-22	4	8
22-24	5	10

TABLE 6: TIME TO UNION

Achieved time (weeks)	No. of cases	Percentage
8-10	7	14
>10-12	11	22
>12-14	14	28
>14-16	10	20
>16-18	3	6
>18-22	3	6
>22	2	4

TABLE 7: TIME AT WHICH FULL WEIGHT BEARING ACHIEVED

Knee Flexion (Degrees)	No. of cases	Percentage
<90	27	54
91-109	19	38
>110	04	08

TABLE 8: KNEE FLEXION

TABLE 9: COMPLICATIONS:

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Rating	No. of cases	Percentage
Excellent >85 points	28	56
Good 70-84 points	12	24
Fair 50-69 points	06	12
Poor <50 points	04	08
TABLE 10: FUNCTIONAL RATING AS PER NEER'S RATING SCORE		

Long term final results were rated using Neer's rating system, which allots points for pain, function, working ability, joint movements, gross and radiological appearance. Neer's score was assigned for each patient. Using this scale there were 28(56%) excellent results, 12 (24%) good results, 6 (12%) fair results and 4 (8%) poor result.

STUDY	Age group (years)	Average age (years)	Male (In no.)	Female (In no.)
EJ Yeap	15 - 85	44	07	04
Siliski	15 - 82	47.2	34	17
Manohar	21 - 75	45	15	10
Present study	18 - 75	38.9	39	11
TABLE 11: COMPARISON OF DEMOGRAPHIC PROFILE WITH OTHER STUDIES				

STUDY	TOTAL	RTA %	COMPOUND
EJ Yeap	11	07	04(36%)
Siliski	52	75	19(38%)
Manohar	25	60	03(12%)
Present study	50	78	13(26%)
TABLE 12: COMPARISION OF MECHANISM OF INJURY AND FRACTURE TYPES			

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Study	Average union rate (wk)	Full weight bearing (wk)	Average knee flexion (in degree)
EJ Yeap	18		107.7
Siliski	13.6	13.6	107
Manohar		21	75.6
Present study	16.7	13.92	94.1

TABLE 13: COMPARISON OF UNION RATE, FULL WEIGHT BEARING AND AVERAGE KNEE FLEXION BETWEEN DIFFERENT STUDIES

Study					Complications
	Excellent	Good	Fair	Poor	
EJ Yeap (SCHATZKER)	04	04	02	01	0 knee pain; 0 infection; 2 implant failure
Siliski (NEER's)	26	16	06	04	8 knee pain; 3 infection;
Manohar (NEER's)	06	10	05	04	5 early OA; infection 1 non-union
Pres. Study (NEER's)	28	12	06	04	15 knee pain 7 infection 6 delayed union 5 shortening 5 stiffness

TABLE 14: COMPARISON OF FUNCTIONAL OUTCOMES

ASSESSMENT OF PATIENT WITH NEER'S SCORING SYSTEM:

Functional (70 points) and Anatomical (30 points):

Excellent- more than 85 points

Good- 70 to 85 points

Fair- 55 to 69 points

Poor- less than 55 points

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